PHARMACY & BACT.
LIBRARY

Pharm

INTERNATIONAL BULLETIN OF BACTERIOLOGICAL NOMENCLATURE AND TAXONOMY

OHIO STATE UNIV.
APR 28 1960

Volume 10 April 15, 1960 No. 2

CONTENTS

EDITORIAL BOARD
Draft proposal for emendation of the International Code of Nomenclature of the Bacteria and Viruses. 57
BARKLEY, FRED A.
Designations of types of virus taxa, II. 65
HORMAECHE, E. and P. R. EDWARDS
A proposed genus Enterobacter. 71
HORMAECHE, E. and P.R. EDWARDS
Proposal for the rejection of the generic name Cloaca Castellani and Chalmers, and proposal of Enterobacter as a generic name with designation of type species and of its type culture. 75
EDITORIAL BOARD
Request that the name of a genus of bacteria be recognized as not validly published if its characterization was based upon impure or mixed cultures. Preliminary Statement. 77

BOOK REVIEWS. 79
EWING, W.H.
Emendation of paragraph 6 of Opinion 11. 85

OFFICIAL ORGAN OF THE JUDICIAL COMMISSION AND OF THE INTERNATIONAL COMMITTEE ON BACTERIOLOGICAL NOMENCLATURE

PUBLISHED QUARTERLY

FOR THE INTERNATIONAL ASSOCIATION OF MICROBIOLOGICAL SOCIETIES
WITH ASSISTANCE THROUGH SUBVENTIONS BY THE
UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION
AND THE
INTERNATIONAL UNION OF BIOLOGICAL SCIENCES

IOWA STATE UNIVERSITY PRESS
PRESS BUILDING, IOWA STATE UNIVERSITY
AMES, IOWA U.S.A.

INTERNATIONAL BULLETIN
OF
BACTERIOLOGICAL NOMENCLATURE
AND
TAXONOMY
Volume 10 April 15, 1960 No. 2

DRAFT PROPOSAL FOR EMENDATION OF THE INTERNATIONAL CODE OF NOMENCLATURE OF THE BACTERIA AND VIRUSES

Preliminary Statement

Editorial Board*

The formulation of a suitable proposal for emendation of the International Code of Nomenclature of the Bacteria and Viruses which would include provision for additional (optional) infrageneric ranks of taxa in addition to subgenus has been asked. Some authors in revising the classification of certain genera of bacteria which include many species have recognized taxa intermediate between subgenus and species. In most cases they have used the names Section, Subsection, Series and Subseries for these categories as listed in the International Code of Botanical Nomenclature. Should specific provision be made for recognition in the Bacteriological Code of additional taxa between genus and species? The following statement reviews the status of infrageneric taxa in the three biological codes of nomenclature, and formulates a draft proposal for emendation of the bacteriological code. After consideration of comments and suggestions received, a proposal will be drafted for consideration by the Judicial Commission. If approved, it will then be submitted to the members of the International Committee on Bacteriological Nomenclature for action.

Nature of Proposal. It is proposed that the International Code of Nomenclature of the Bacteria and Viruses be amended by the recognition of four optional ranks of taxa between subgenus and species. A rewording of Principle 7, Rules 5, 9a, 9c and of Recommendation 13 to include 4 in-

*R. E. Buchanan, S. T. Cowan and W. A. Clark.

LIBRARY

frasubgeneric ranks of taxa, section, subsection, series and subseries is suggested.

The number of described and named species in certain genera of bacteria is large. One hundred forty-nine named species of the genus Streptomyces are included in Bergey's Manual of Determinative Bacteriology (7th. ed.). The number of species named in the extensive literature is several times as large. Bergey's Manual also describes and names 149 species of Pseudomonas, 60 species of Xanthomonas, and 93 species of Clostridium. Some of the genera as treated in Krassilnikov's Manual are also large.

Infrageneric and Infrasubgeneric Taxa in Biological Nomenclature

The codes of nomenclature of all three of the biological disciplines, bacteriology, botany, and zoology, provide for the "subgenus" as the primary infrageneric taxon. The Botanical Code is the only one which provides for infrasubgeneric taxa.

Bacteriology. The Bacteriological Code recognizes the subgenus as the single infrageneric taxon. The subgenus and genus, as in zoology, are regarded as coordinate nomenclaturally. It is proposed that four infrasubgeneric ranks of taxa be recognized, but not coordinate nomenclaturally with genus and subgenus.

Zoology. The Bradley draft of the Zoological Code, like the Bacteriological Code, recognizes the rank subgenus as the designation of the single infrageneric taxon. However, provision is made for the recognition of names of those of subgenera even though not labeled as such. The statement (Art. 14, Sect. 3) reads:

> A name that would qualify as an available generic name, were it so proposed, shall have the nomenclatural status of a subgeneric name when applied to a group of species within a given genus, even though the group to which it was applied was expressly designated by an expression such as 'section,' 'division,' 'group,' or the equivalent.

The accompanying Explanation states:

> While divisions of genera are all to be treated nomenclaturally as though they were subgenera, that does not imply that they may not be differentiated taxonomically.

In other words, they may be treated as different grades of subgenera.

It seems that the names of all "grades of subgenera" are to be regarded as nomenclaturally coordinate, and that the names of all genera and of subgenera of every grade are subject to the laws of homonymy.

Botany in its 1956 Code recognizes five infrageneric ranks of taxa named in descending sequence, subgenus, section, subsection, series, and subseries. Any one of the primary subdivisions, subgenus, section, or series, may be used in a genus independently, but use of subsection or subseries apparently implies the simultaneous recognition of section and series respectively. The name of each of these infrageneric taxa (Art. 21, p. 22) "is a combination of a generic name and a subdivisional epithet connected by a term (subgenus, section, series, etc.) denoting its rank." The following examples are given: Banisteria subg. Hemiramma; Ricinocarpos sect. Anomodiscus; Sapium subsect. Patentinervia; Euphorbia sect. Tithymalus subsect. Tenellae.

In botany the name of a subdivision of a genus must at least be a binary combination, the generic name followed by a single epithet, in some cases by two epithets; conceivably the name of a subseries in a genus must be written with five epithets following the generic name. In practice such multiverbal combinations apparently do not occur. The Botanical Code further states: "The same epithet may be used for subdivisions of different genera, but two subdivisions of the same genus, even if they are of different rank, cannot bear the same epithet unless they are based on the same type." In other words, all the names of the infrageneric taxa of a genus are nomenclaturally coordinate from the standpoint of homonymy, but do not compete with the subdivisional epithets within other genera, nor with the names of taxa of other ranks.

The subgeneric or sectional epithet in botany is usually a substantive resembling the name of a genus or repeating the name of the genus itself. "It is further recommended that for subsections, series, and subseries the epithet is preferably a plural adjective agreeing in gender with the generic name and written with a capital letter." At first sight the recommendation that an epithet be a plural adjective which agrees in gender but not in number with the generic name with which it constitutes a binary combination seems to be advocating grammatical inconsistency. One is

reminded that an adjective used as a specific epithet must agree in both gender and number with the name of the genus. Why this apparent discrepancy? This usage has long been recognized in botany. An apparent explanation of the apparent anomaly is to be found in the use of plural adjectives as nouns in the naming of taxa of many suprageneric ranks such as the family. For example, there exist other genera of plants related to the genus Rosa, they were grouped together as Plantae rosaceae, the family of rose-like plants. The plural adjectival epithet by ellipsis became the name of the family. Similarly with the genus it may be wise to recognize certain groups of species. Within the genus Rosa there may be several species that form a natural group having certain characters in common with Rosa setosa, there is a group of "setose" roses, in a series that might be called Rosae setosae. Here the plural epithet setosae may emerge as the series epithet Setosae. Generic names in botany were often used in the plural in this way. Perhaps a clearer statement for the Code would be to say that the epithet of a subsection, a series, or a subseries is preferably a plural adjective agreeing in gender and number with the plural form of the generic name.

In bacteriology there are authors who have recognized that the inclusion in botany of four more ranks of infrageneric taxa than are authorized specifically in the Bacteriological Code has some advantages when applied to the ordering of the taxonomy of certain bacterial genera. Such authors have used in consequence some of the provisions of the Botanical Code with a degree of satisfaction. The Bacteriological Code contains no prohibition, but instead inferential encouragement for such additional ranks of taxa when needed.

Summary.

1. The recognition of additional ranks of taxa between genus and species has been urged as advantageous in the systematic treatment of the species in certain genera of bacteria.
2. The Bacteriological Code, like the Zoological Code and unlike the Botanical Code, recognizes the name of a subgenus as a single word (a noun), coordinate from the standpoints of priority and homonymy with generic names. The Botanical Code defines the subgenus as

a binary combination, consisting of the generic name followed by a subgeneric epithet. The epithet is not the name of the subgenus. A subgeneric epithet has no status in priority or homonymy outside the genus it is included.

The rules governing the rank of subgenus in bacteriology have been generally accepted, a change to the botanical concept would require some nomenclatural changes and lead to some confusion. A change from the present concept and definition is probably undesirable.

3. Additional ranks of taxa below the genus in bacteriology, if made, would seem logically to be infrasubgeneric, to be placed between subgenus and species.
4. Nomenclaturally it may be desirable to include the ranks of section, subsection, series and subseries as infrasubgeneric taxa in the Bacteriological Code.
5. The Botanical Code requires that the name of an infrasubgeneric taxon be a binary, ternary or other combination of which the first term is the name of the genus and the last the sectional, subsectional, series or subseries epithet. Use of this concept of the name of a infrasubgeneric taxon it is believed would be confusing and cumbersome if applied in bacteriology.
6. It is proposed the bacteriological and zoological precedent recognizing a single word as the name of an infrasubgeneric taxa in bacteriology be continued. The method of forming epithets of infrasubgeneric taxa as given in the Botanical Code should prove acceptable for formation of the names of infrasubgeneric taxa in bacteriology.
7. As in the provisions of the Botanical Code, the rules governing priority and homonymy apply to the names of taxa of infrasubgeneric rank within a genus, they do not apply to use of the same names in different genera.

Draft Proposal of the Amendment

A. (1). Emend Principle 7 (Page 13, 1958 ed. paragraph three, to read as follows:

"In some genera the infrasubgeneric taxa section (sectio) and series (series) are recognized.

In many species, subspecies or varieties are distinguished; in some cases subdivisions of a species such as strains, groups, serotypes, variants, phases, and others may be recognized."

(2). In the fourth paragraph of Principle 7 delete "etc." at the end and add "subsection, a rank between section and series, and subseries, a rank between series and species."

(3). The draft paragraph as amended will read:

"(c) If a greater number of intermediate categories (ranks) is required, the terms for these subdivisions are made by adding the prefix 'sub-' to the terms denoting the ranks. Thus subfamily denotes a rank between family and tribe, subtribe a rank between tribe and genus, subsection a rank between section and series, and subseries a rank between series and species."

B. Emend Rule 5 (Chapter 3, Sect. 1, p. 26) as follows:

Prefix the following title to Rule 5 and revise as follows.

Rule 5. Names of genera and of infrageneric taxa.

Rule 5a. Names of genera and subgenera.

1. Paragraph present 5a with no change.
2. Paragraph present 5b with no change.
3. Paragraph present 5c with no change.

Rule 5b. Names of infrasubgeneric taxa; section, subsection, series and subseries.

1. The name of a section is a substantive or an adjective used as a substantive resembling the name of a genus or subgenus.
2. The name of a subsection, series or subseries is preferably a plural adjective used as a substantive or a substantive, spelled with an intial capital letter. A name having the form of a plural adjective agrees in gender and number with the plural of the name of the genus.

3. The same names of section, subsections, series, and subseries may be used for infrasubgeneric subdivisions in different genera.
4. The same name for two infrasubgeneric subdivisions in the same genus may not be used, even if they are of different ranks, unless they are based upon the same type.
5. An infrasubgeneric name is not from a nomenclatural standpoint coordinate with names of genera and subgenera. It has no status in priority or homonymy outside the genus in which it is included.

C. Emend Rule 9a(Sect. 2, p. 53) as follows: In the second sentence, revise the phrase "that of a genus or a subgenus is a species" to read, "that of a genus, a subgenus, or an infrasubgeneric taxon (of the rank of section, subsection, series, or subseries) is a species." The revised sentence reads:

"The nomenclatural type of a class or subclass is an order, that of an order or suborder is a family, that of a family, subfamily, tribe, or subtribe is a genus, that of a genus, subgenus, or an infrasubgeneric taxon (of the rank of section, subsection, series, or subseries) is a species."

D. Emend Rule 9c (Sect. 2, p. 54) as follows: emend the first line to read as follows:

Rule 9c. Designation of the nomenclatural type of a genus or subgenus and of an infrasubgeneric taxon of the rank of section, subsection, series or subseries.

Add a paragraph (4) to Rule 9c to read:

(4). The nomenclatural type of a section, subsection, series, or subseries shall be a species and its selection shall be governed by the rules governing the selection of type species for genera and subgenera as outlined in Rule 9c (1), (2), and (3).

E. Emend Rule 13 to read as follows (Sect. 3, p. 70):

Rule 13a. The name of a genus or of a subgenus is not validly published unless it is accompanied

(1). by a description of the genus or subgenus, or by citation of a previously and effectively published description of the genus or subgenus, or by citation of a previously and effectively published description of the genus as a subgenus or of the subgenus as a genus, or in the case of a monotypic new genus based on a new species, by a combined generic and specific description.

(2). and by a description of one or more species or by citation of a previously and effectively published description of one or more species included in the genus.

Rule 13b. The name of an infrasubgeneric taxon (section, subsection, series, subseries) is not validly published unless it is accompanied

(1). by a description of the taxon or by a citation of a previously and effectively published description of the taxon, and

(2). by the description of one or more included species or by citation of a previously and effectively published description of one or more species included in the taxon.

F. Emend Recommendation 6a by adding at the end, the following sentence:

"When it is desired to indicate the name of a section, subsection, series, or subseries in connection with the name of a species, the name of the rank of the infrasubgeneric name followed by the name of the taxon may be placed in parentheses between the two."

INTERNATIONAL BULLETIN OF BACTERIOLOGICAL NOMENCLATURE AND TAXONOMY
Volume 10 No. 2 April 15, 1960 pp. 65-70

DESIGNATION OF TYPES OF VIRUS TAXA, II.

Fred A. Barkley*

Since the publication of the previous list (Barkley. Int. Bull. Bact. Nomen. Tax. 8:117-130. 1958.) some additional material has come to hand which should be indicated. Further some corrections need to be made. The author is grateful to Dr. F.O. Holmes and to Mr. J. Cohn for pointing out some of the errors and ambiguities in the original paper.

The writer recently received a reprint of the article[1] by Zhdanov and Korenblit (Zhdanov and Korenblit, Zhurnal Microb. Epid. i Immuno-biol. 9:40-44. 1950.). Dr. Zhdanov has stated that the journal was printed and distributed in Russia. While there may be some question as to whether this constitutes valid publication, there are no specified repositories necessary for deposit of newly published names of viruses. The descriptions of these consist only of their common names in Russian, quite in contrast with the full characterization given by Zhdanov in his later publications (Zhdanov. Opred. Virusov. Chelov. i Zhivot. 348 pages. Moscow. 1953; Shdanow. Viren. 279 pages. Jena. 1957.). The present writer would consider a virus as having been described, if that virus may be identified from its description, however brief the description may be. (No one has proposed a realistic specification for the description of viruses; information on size, growth in embryonated eggs or in experimental animals, Latin descriptions, type cultures, electron photomicrographs, and experimental infections is desirable, but not always possible.)

Since the list originally published (Barkley, loc. cit. 1958.) includes only those names listed in Zhdanov and Korenblit (1950) as cited by Zhdanov (1953), some additional names published in 1950 but not cited by Zhdanov must be added.

Pagination corrections in the author's original list, with reference to the Ryzhkov publication of 1952 (Microbio-

*Microbiology Department, Basic Science Division, Warner Lambert Research Institute, Morris Plains, New Jersey.

[1] This separate of the publication is now deposited in the Library of Congress in Washington.

logiya 21:458-476.) are to be entered as follows: Page 466, Piesmaphilaceae, Quanjeriaceae, Piesmaphilus and Quanjeria; page 465, Aphidophilaceae and Aphidophilus. The entry Cycadinaefilaceae should be deleted.

The other corrections and additions are better treated as complete entries for each name, as indicated below. (The entries which should replace those in the earlier list are indicated by an asterisk.)

For completeness, and to avoid ambiguity, the work of Sh. D. Mochkovsky is included (Ch. D. Mochkovski.[1] Uspekhi sovremennoi biologii 19:1-44. 1945.), although the types for the entities listed therein, have for the most part, appeared in many works published subsequently.

Dr. Philip (C.B. Philip. Can. J. Microb. 2:261-270. 1956.) has designated types for most of the Rickettsiaceae taxa referred to by Zhdanov and Korenblit and by Zhdanov.

DESIGNATION OF TYPES FOR CERTAIN SUPRAGENERIC TAXA OF VIRUSES

Acarinophilaceae Ryzhkov, 1952 p. 466. Type genus: Acarinophilus Ryzhkov

*Arthropodophilae Ryzhkov, 1950 pp. 14, 15. Type order: Pantropales Ryzhkov (Page 16 as Arthrodophilaceae)

Bartonellaceae Mochkov., 1945 p. 18. Type genus, monotype: Bartonella Strong, Tyzzer, et al.

*Beijerinckiales Ryzhkov, 1952 p. 465. Type family: Crystallococcaceae Ryzhkov

Chlamydozoa Mochkov., 1945 p. 18. Type family: Chlamydozoaceae "Prowazek" ex Mochkov., 1945 p. 18.

Chlamydozoaceae Mochkov., 1945 p. 18. Type genus; monotype: Chlamydozoon "Prowazek" ex Mochkov.

Chlamydozoaceae Mochkov. ex Zhd. and K., 1950 p. 42 ex Zhd., 1953 p. 174. Type genus: Chlamydozoon Mochkov.

Cytoryctaceae Mochkov., 1945 p. 18. Type genus: Cytoryctes Guarneiri

[1] The transliteration of Mochkovski as used here is the one used by that author himself (Mochkovski. 1945 p. 18).

Ehrlichiaceae Mochkov., 1945 p. 18. Type genus: Ehrlichia Mochkov.

*Flagellophoraceae Ryzhkov, 1950 p. 19. Type genus: Flagellophorus Ryzhkov (as Flageliophoraceae p. 19)

Haemorrhagogenaceae Zhd. and K., 1950 p. 44. Type genus: Haemorrhagogenes Zhd. and K. (as Haemorrhagenes p. 44)

Hepatophilaceae Zhd. and K., 1950 p. 44. Type genus: Hepatophilus Zhd. and K.

Ivanovskja Sukhov, 1956 p. 264. Type class: Gamaleyae Ryzhkov

Ivanovskya Ryzhkov, 1950 p. 12. Type class: Gamaleyae Ryzhkov

*Latentiaceae Ryzhkov, 1950 p. 18. Type genus: Latentia Ryzhkov

*Leptomotropaceae Ryzhkov, 1952 p. 466. Type genus: Leptomotropus Ryzhkov (as Leptomotropiaceae p. 46.)

*Leptomotropales Ryzhkov, 1952 p. 466. Type family: Leptomotropaceae Ryzhkov (as Leptomotropiales p. 466.)

Macrovinrineae Zhd. and K., 1950 p. 43. Type family: Strongyloplasmaceae Zhd. and K. non Lipschütz

Mesovirineae Zhd. and K., 1950 p. 43. Type family: Pneumophilaceae Zhd. and K.

Microviraceae Zhd. and K., 1950 p. 44. Type genus, monotype: Microvirus Zhd. and K.

Microvirineae Zhd. and K., 1950 p. 44. Type family, monotype: Microviraceae Zhd. and K.

*Myelinophagaceae Ryzhkov, 1950 p. 19. Type genus: Myelinophagus Ryzhkov

Neuromyophilaceae Zhd., 1953 p. 303. Type genus: Myelophilus Zhd.

Neurophilaceae Zhd. and K., 1950 p. 44. Type genus: Neurophilus Zhd. and K.

Neuroryctaceae Mochkov., 1945 p. 18. Type genus, monotype: Neuroryctes Calkins

*Neurotropaceae Ryzhkov, 1950 p. 17. Type genus: Neurotropus Ryzhkov (as Neurotropiaceae p. 17)

*Neurotropales Ryzhkov, 1950 pp. 15, 17. Type family: Neurotropaceae Ryzhkov (as Neurotropiales pp. 15, 17)

*Pneumotropaceae Ryzhkov, 1950 p. 18. Type genus: Pneumotropus Ryzhkov (as Pneumotropiceae p. 18)

*Pantropaceae Ryzhkov, 1950 p. 16. Type genus: Pantropus Ryzhkov (as Pantropiaceae p. 16)

*Pantropales Ryzhkov, 1950 p. 16. Type family: Pantropaceae Ryzhkov (as Pantropiales p. 16)
Viralia Zhd. and K., 1950 p. 42. Type order: Protophytovirales Zhd. and K.
Viscerophilaceae Zhd. and K., 1950 p. 44. Type genus: Viscerophilus Zhd. and K.
Zoovirales Zhd. and K., 1950 p. 42. Type family: Rickettsiaceae Pinkerton
Zooviralia Zhd., 1953 p. 147. Type order: Rickettsiales Bengston

DESIGNATIONS OF TYPE SPECIES FOR CERTAIN GENERA AND SUBGENERA OF THE VIRUSES

Acarinaphilus Ryzhkov, 1952 p. 466. Type species: Acarinaphilus antholysatus Ryzhkov
Aëdephilus Ryzhkov, 1952 p. 466. Type species: Aëdephilus dengue Ryzhkov
Aëgyptionella Carpano ex Mochkovski, 1945 p. 18. Type species, monotype: Aëgyptionella pullorum Carpano
Bartonella Strong, Tyzzer et al ex Mochkov., 1945 p. 18. Type species, monotype: Bartonella bacilliformis Strong, Tyzzer et al.
Borreliota Goodpasture ex Mochkov., 1945 p. 18. Type species, monotype: Borreliota avium Goodpasture
Chlamydozoon Mochkov. ex Zhd. and K., 1950 p. 43 ex Zhd., 1953 p. 189. Type species: Chlamydozoon trachomatis Mochkov.
Chlamydozoon "Prowazek" ex Mochkov., 1945 p. 18, sed non Chlamydozoon Halberstaedter and von Prowazek! Type species: Chlamydozoon trachomatis "Prowazek" ex Mochkov.
Coxiella Zhd. and K., 1950 p. 42. Type species, monotype: Coxiella diaporica Zhd. and K. (as Cexiella diaparica, cf. Philip p. 265)
Coxiella Zhd., 1953 p. 163. Type species, monotype: Coxiella diaporica Zhd. (cf. Philip p. 265)
*Crystallococcus Ryzhkov, 1952 p. 465. Type species: Crystallococcus lycopersici (not C. tabaci, see Ryzhkov)

Cytoectes Tyzzer ex Mochkov., 1945 p. 18. Type species, monotype: Cytoectes microti Tyzzer

Cytoryctes Guarnieri ex Mochkov., 1945 p. 18. Type species: Cytoryctes variolae Guarnieri

Dermacentroxenus Wolbach ex Mochkov., 1945 p. 18. Type species: Dermacentroxenus rickettsi Wolbach and Todd

Ehrlichia Mochkov., 1945 p. 18. Type species: Ehrlichia kurlovi Mochkov.

Ehrlichia subg. Miyagawanella Mochkov., 1945 p. 18. Type species: Ehrlichia (Miyagawanella) lymphogranulomatosis Mauro ex Mochkov. (as Myiagawanella p. 18)

Eperythrozoon Schilling ex Mochkov., 1945 p. 18. Type species: Eperythrozoon coccoides Schilling

Grahamella Brumpt ex Mochkov., 1945 p. 18. Type species: Grahamella talpae Brumpt

Haemorrhagogenes Zhd. and K., 1950 p. 44. Type species: Haemorrhagogenes sibiricus Zhd. and K. (as Haemorrhagenes p. 44)

*Haemorrhagogenes Zhd., 1953 p. 282. Type species: Haemorrhagogenes sibiricus Zhd. and K. (not H. suis)

Kurlovia Zhd. and K., 1950 p. 42 ex Zhd., 1953 p. 166. Type species: Kurlovia ruminantium Zhd. and K. (cf. Philip. p. 265)

Kurlovia subg. Cowdria Zhd. and K., 1950 ex Zhd., 1953 p. 166. Type species: Kurlovia (Cowdria) ruminantium Zhd. and K. (cf. Philip p. 265)

Kurlovia subg. Ehrlichia Zhd. and K., 1950 p. 42 ex Zhd., 1953 p. 167. Type species: Kurlovia (Ehrlichia) canis Zhd. and K. (cf. Philip p. 265)

*Löffleria Ryzhkov, 1950 p. 16. Type species, monotype: Löffleria bovi Ryzhkov (corrected from L. equi by Ryzhkov 1953 p. 159)[2]

*Myelovirus Ryzhkov, 1952 p. 465. Type species: Myelovirus hominis Ryzhkov (not M. Mengo, see Ryzhkov)

Neuroryctes Calkins ex Zhd. and K., 1950 p. 43. Type species: Neuroryctes rabiei Zhd. and K.

*Neurotropus Ryzhkov, 1950 p. 16. Type species, monotype: Neurotropus americanus Ryzhkov (not N. hominis)

---

[2]Ryshkow, W. L. Sowjetwissenschaft (Naturwissenschaftenliche Abteilung) 6:151-173. 1953.

*Pantropus Ryzhkov, 1950 p. 16. Type species: Pantropus tchumakovi Ryzhkov (not P. dengue, see Ryzhkov)

Photophilus Ryzhkov, 1952 p. 467. Type species: Photophilus elegans Ryzhkov

*Piesmaphilus Ryzhkov, 1952 p. 466. Type species: Piesmaphilus europeus Ryzhkov

Rickettsia da Rocha-Lima ex Mochkov., 1945 p. 18. Type species: Rickettsia prowazekii da Rocha-Lima

Rickettsia subg. Acaroxenus Zhd. and K., 1950 p. 42. Type species, monotype: Rickettsia (Acaroxenus) varioleidis Zhd. and K. (cf. Philip p. 265)

Rickettsia subg. Cowdria Mochkov., 1945 p. 18. Type species: Rickettsia (Cowdria) ruminantium (Cowdry) Mochkov.

Rickettsia subg. Dermacentrexenus Zhd. and K., 1950 p. 42. Type species: Rickettsia (Dermacentrexenus) rickettsi Zhd. and K. (cf. Philip p. 264)

Rickettsia subg. Gamasoxenus Zhd., 1953 p. 159. Type species, monotype: Rickettsia (Gamasoxenus) muris Zhd. (cf. Philip p. 264)

Rickettsia subg. Ixodoxenus Zhd., 1953 p. 155. Type species: Rickettsia (Ixodoxenus) rickettsi Zhd. (cf. Philip p. 263)

Rickettsiaformis Zhd. and K., 1950 p. 43 ex Zhd., 1953 p. 175. Type species: Rickettsiaformis lymphogranulomatis Zhd. and K. (cf. Philip p. 263)

Strongyloplasma subg. Zoovariola Zhd. and K., 1950 p. 42. Type species: Strongyloplasma (Zoovariola) ovium Zhd. and K.

Strongyloplasma Lipschütz ex Mochkov., 1945 p. 18. Type species, monotype: Strongyloplasma hominis Lipschütz

Trombidoxenus Zhd. and K., 1950 p. 42 ex Zhd., 1953 p. 160. Type species, monotype: Trombidoxenus orientalis Zhd. and K. (cf. Philip p. 265)

*Virothrix Ryzhkov, 1950 p. 16. Type species: Virothrix hominis Ryzhkov

Virothrix Ryzhkov, 1952 p. 465 non Ryzhkov 1950 p. 16. Virothrix ivanovskii Ryzhkov

Wolhynia Zhd. and K., 1950 p. 42. Type species: Wolhynia quintanae Zhd. and K. (as Welhynia, cf. Philip p. 265)

Wolhynia Zhd., 1953 p. 164. Type species: Wolhynia quintanae Zhd. (cf. Philip p. 265)

INTERNATIONAL BULLETIN OF BACTERIOLOGICAL NOMENCLATURE AND TAXONOMY
Volume 10 No. 2 April 15, 1960 71-74

A PROPOSED GENUS ENTEROBACTER

E. Hormaeche and P. R. Edwards

Instituto de Higiene, Montevideo, Uruguay, and Communicable Disease Center, Public Health Service, U.S. Department of Health, Education and Welfare, Atlanta, Georgia

It was demonstrated by Edwards (1) more than 30 years ago that cultures accepted as typical strains of Aerobacter aerogenes, and isolated under circumstances which did not indicate that they had any immediate connection with the intestinal tract of man or animals, were indistinguishable from Klebsiella cultures and, indeed, some of them were biochemically and serologically identical with classical Friedländer strains. In spite of this observation, and although the Judicial Commission has conserved the generic term Klebsiella Trevisan 1885 and the specific epithet Klebsiella pneumoniae (Schroeter) Trevisan 1885, such organisms when isolated from stools, urine, soil, and water, continue to be classified as A. aerogenes. Most workers in systematic bacteriology would agree with the original description of Beijerinck (2) that the majority of strains of A. aerogenes are nonmotile, yet no method has been devised to distinguish such strains from Klebsiella pneumoniae. Here we are faced with a paradoxical situation. The Judicial Commission has conserved Klebsiella pneumoniae but the majority of cultures which conform to the description of that species continue to be classified in the genus Aerobacter. In Bergey's Manual (3) both motile and nonmotile strains of A. aerogenes are recognized but no method is given whereby the nonmotile strains can be distinguished from strains of the genus Klebsiella. Capsules and slime formation are of no value in differentiation since both properties are found in both motile and nonmotile strains and may vary within a single culture. Although Breed, Murray and Smith (3) recognize this situation, they continue to place organisms indistinguishable from K. pneumoniae in the genus Aerobacter, giving as their reason the difficulties encountered by earlier workers in distinguishing between such organisms and motile forms classified as Aerobacter cloacae. Considering the

present state of our knowledge of the biochemical properties of the two groups, such a standpoint hardly seems tenable.

It was the above-described situation which prompted Hormaeche and Edwards (4) to propose the genus Aerobacter be limited to forms which typically were motile and which could be distinguished from the genus Klebsiella by biochemical methods. Two species were described, A. aerogenes and A. cloacae. Inasmuch as the term Aerobacter has been so misused, and since this misuse probably will continue so long as the genus Aerobacter is recognized, it now seems best to withdraw this proposal and to seek another solution.

The generic name Cloacae Castellani and Chalmers 1919, has not been conserved nor has it found wide use. Further, the name of the type species of Cloaca, C. cloacae, is almost a tautonym and should be rejected under Rule 25 of the Bacteriological Code. It would not be logical to conserve both Cloaca and Aerobacter, since the same organisms have been classified in both. We are faced either with continuing to recognize Aerobacter, the disadvantages of which have been enumerated, or of seeking a neutral designation.

The new generic name Enterobacter is proposed with type species Enterobacter cloacae (basionym Bacillus cloacae Jordon 1890). The name Enterobacter proposed by Rahn (1937) was not validly published and in consequence has no standing in nomenclature and cannot be cited as an earlier homonym of the newly proposed generic name Enterobacter. According to our present taxonomic knowledge, the nonmotile cultures hitherto designated as A. aerogenes, other than nonmotile variants of Enterobacter which can be distinguished by biochemical methods, must be classified in the genus Klebsiella, which has been conserved. The motile forms previously designated as A. cloacae and A. aerogenes would be included in the genus Enterobacter as E. cloacae or E. aerogenes according to their biochemical reactions which are defined below.

Enterobacter gen. nov.

Motile peritrichously flagellated rods conforming to the definition of the family Enterobacteriacae. Gram negative, grow readily on ordinary media. Ferment glucose and lac-

tose with the production of acid and gas. Produce two or more times as much carbon dioxide as hydrogen from glucose. Methyl red test negative; Voges-Proskauer test positive. Trimethyleneglycol not produced from glycerol by anaerobic fermentation. Citric acid and salts of citric acid are utilized as sole sources of carbon. Hydrogen sulfide is not produced. Aerobic, facultatively anaerobic. Widely distributed in nature. Nonmotile and anaerogenic variants occur which may be recognized by their otherwise typical biochemical behavior.

The type species is E. cloacae (Jordan 1890) Nov. Comb. The biochemical reactions of E. cloacae and E. aerogenes are given in Table 1.

Typical neotype cultures have been deposited in the American Type Culture Collection and the National Collection of Type Cultures, London, under the following numbers: E. cloacae, 279-56 (ATCC 13047; NCTC 10005); E. aerogenes, 819-56 (ATCC 13048; NCTC 10006).

REFERENCES

1. Edwards, P.R. 1929. J. Bact. 17: 339.
2. Beijerinck, M.W. 1900. Zbl. Bakt., II Abt. 6: 193.
3. Breed, R.S., E.G. D. Murray and N.R. Smith. 1957. Bergey's Manual of Determinative Bacteriology, Williams and Wilkins Co., Baltimore.
4. Hormaeche, E. and P.R. Edwards. 1958. Intern. Bull. Bact. Nomen. and Taxon. 8: 111.
5. Rahn, O. 1937. Zbl. Bakt., I Abt. 96: 280.
6. Hormaeche, E. and M. Munilla. 1957. Intern. Bull. Bact. Nomen. and Taxon. 7: 1.

ACKNOWLEDGMENT

The writers are indebted to Dr. F. Kauffmann for suggesting the term Enterobacter as a solution of the problem posed by continued application of the term Aerobacter to cultures which should be classified in the genus Klebsiella.

Table 1. Biochemical Characteristics

	Enterobacter aerogenes	Enterobacter cloacae
Gas from glucose	+	+
Lactose (acid)	+	+
Sucrose	+	+
Mannitol	+	+
Dulcitol	d	d
Salicin	+	+
Adonitol	d	d
Inositol (gas)*	+	-
Glycerol (gas)*	+	-
Rhamnose	+	+
Raffinose	+	+
Arabinose	+	+
Xylose	+	+
Sorbitol	+	+
Cellobiose (gas)*	+	+
Insoluble starch (gas)**	-	-
Indol	-	-
Methyl red	-	-
Voges-Proskauer	+	+
Ammonium citrate	+	+
Hydrogen sulfide	-	-
Urease***	-	-
Gelatin liquefaction	d	+
Growth in KCN medium	+	+
Lysine decarboxylase	+	-
Arginine dihydrolase	-	+
Ornithine decarboxylase	+	+
Glutamic acid decarboxylase	-	-
Motility	+	+

* Visible gas production within 48 hours.
** Visible gas production within 4 days.
*** Tested by method of Hormaeche and Munilla (6).
\+ Promptly positive.
\- Negative.
d Different biochemical types.

INTERNATIONAL BULLETIN OF BACTERIOLOGICAL NOMENCLATURE AND TAXONOMY
Volume 10 No. 2 April 15, 1960 pp. 75-76

PROPOSAL FOR THE REJECTION OF THE GENERIC NAME CLOACA CASTELLANI AND CHALMERS, AND PROPOSAL OF ENTEROBACTER AS A GENERIC NAME WITH DESIGNATION OF TYPE SPECIES AND OF ITS TYPE CULTURE

With Request for an Opinion

E. Hormaeche and P.R. Edwards

Instituto de Higiene, Montevideo, Uruguay, and Communicable Disease Center, Public Health Service, U.S. Department of Health, Education and Welfare, Atlanta, Georgia

In the International Bulletin 4, pp. 159-161, was publised a collection of seven draft proposals entitled "Status of the generic names Escherichia, Klebsiella, Aerobacter and Cloacae."

Proposals 1 and 2 were dealt with (Bact. Code, Opinion 15, sections 3 and 4, p. 162). Proposals 5 and 6, alternative 1, also were subjects of opinions (Bact. Code, Opinion 13, section 1, p. 157).

Proposals 3, 4, and 7 have not been the subjects of opinions. These are as follows:

Draft Proposal 3. The generic name Aerobacter Beijernick 1900 shall be placed on the list of conserved bacterial generic names (nomina generum conservanda).

Draft Proposal 4. The type species of the genus Aerobacter is Aerobacter aerogenes (Kruse) Beijerinck 1900 (Bacterium lactis aerogenes Escherich 1885). The specific epithet aerogenes in the species name Aerobacter aerogenes is conserved.

Draft Proposal 7. The generic name Cloaca Castellani and Chalmers 1919 shall be placed on the list of conserved bacterial generic names (nomina generum conservanda).

It is wished to bring forward the following facts and upon them to base additional draft proposals. Since the generic name Klebsiella Trevisan 1885 and the specific epithet Klebsiella pneumoniae (Schroeter) Trevisan 1885 have been conserved, taxonomists now have a satisfactory repository for those nonmotile, encapsulated strains which are found

in respiratory infections and which conform to the classical Friedländer, ozena, and rhinoscleroma types of the enteric bacteria. Included also are the numerous cultures isolated from stools, urine, water and soil which are culturally and biochemically indistinguishable from the above-mentioned types (Edwards, J. Bact., 1929, 17: 339). On the contrary, no name has been conserved for the motile cultures of the same general group and which are covered by Draft Proposals 3, 4, and 7, quoted above, but Hormaeche and Edwards (1958, Intern. Bull. Bact. Nomen. and Taxon. 8: 111) have proposed that Aerobacter Beijerinck should be redefined with a motile organism as the type.

The term Aerobacter aerogenes long has been applied by many workers to those nonmotile cultures of Klebsiella pneumoniae which have been isolated from stools, urine, water, and soil. The application of this name has been so indiscriminate that it will be well nigh impossible to prevent it from being applied to organisms which should be classified as Klebsiella. As it now stands, the term Aerobacter aerogenes is practically a synonym for Klebsiella pneumoniae since, with the exception of infrequently occurring motile cultures of A. aerogenes, the cultures placed in that species properly should be called Klebsiella pneumoniae, which has been conserved. Aerobacter cloacae (Jordan) Bergey et al. 1923 is a synonym of Cloaca cloacae (Jordan) Castellani and Chalmers 1919. The latter term is a tautonym and should be rejected under Rule 25 of the Bacteriological Code. In order to solve the difficulty Hormaeche and Edwards (Intern. Bull. Bact. Nomen. and Taxon., 1960, 10: 71-74) proposed a new genus Enterobacter, with the type species Enterobacter cloacae based on B. cloacae, Jordan 1890. Included in the genus was the species Enterobacter aerogenes which was made up of motile forms previously classified as A. aerogenes. The species were described and neotype cultures designated.

In light of these fact it is requested that opinions be given on Draft Proposals 3, 4, 7 cited above. It further is requested that the term Enterobacter Hormaeche and Edwards be placed in the list of conserved bacterial generic names (nomina generum conservandum) and that Enterobacter cloacae Jordan comb. nov. (B. cloacae Jordan 1890) be designated as the type species.

INTERNATIONAL BULLETIN OF BACTERIOLOGICAL NOMENCLATURE AND TAXONOMY
Volume 10 No. 2 April 15, 1960 pp. 77-78

REQUEST THAT THE NAME OF A GENUS OF BACTERIA BE RECOGNIZED AS NOT VALIDLY PUBLISHED IF ITS CHARACTERIZATION WAS BASED UPON IMPURE OR MIXED CULTURES

Preliminary Statement

Editorial Board

The following draft of a proposed opinion was submitted to the members of the Judicial Committee by the Editorial Board (1959, p. 184).

Opinion____. The name of a genus of bacteria is not validly published if the characterization of the genus when initially proposed was based upon impure or mixed cultures. Such generic name shall have no nomenclatural standing in bacteriology.

The Opinion was approved by the members of the Judicial Commission. However, several members suggested that the opinion as submitted might be regarded as ambiguous or might be misinterpreted. It was pointed out that many genera of free living bacteria (such as Beggiatoa, most of the genera of the Myxobacterales) were adequately characterized on the basis of morphology before any of the included species were cultivated. There are also obligate parasites which have never been cultivated free from the host cells.

To resolve any ambiguity, the draft Opinion, at the suggestion of one of the members of the Judicial Commission, has been amended and resubmitted to the members of the Commission.

Redraft of Proposed Opinion

Opinion____. The name of a genus of bacteria is not validly published if the characterization of the genus was based upon impure or mixed cultures, that is, if there is evidence that its characterization was based on the properties of more than one organism, as in impure or mixed cultures. Such generic name shall have no nomenclatural standing in bacteriology.

REFERENCE

Editorial Board. 1959. Request that the name of a genus of bacteria be recognized as not validly published if its characterization was based upon impure or mixed cultures. Intern. Bull. Bact. Nomen. and Taxon. 9: 183-184.

INTERNATIONAL BULLETIN OF BACTERIOLOGICAL NOMENCLATURE AND TAXONOMY
Volume 10 No. 2 April 15, 1960 79-84

BOOK REVIEWS

Bacteriological Nomenclature

A Guide to the Identification of the Genera of Bacteria. By V. B. D. Skerman. September, 1959, 217 pp. The Williams and Wilkins Company, Baltimore 2, Maryland.

Mr. Skerman previously had prepared the useful and ingenious artifical key to the genera of bacteria as published in the 7th edition of Bergey's Manual of Determinative Bacteriology (1957). This key (47 pp.) republished in his "Guide" he has now somewhat revised and amended by inclusion of the names of certain genera not previously treated. This key has been repeatedly tested; there are many attestations as to its reliability. The annotations included in the key are to the point and should be helpful to the student. One accustomed to the conventional dichotomous key is surprised to find that the name of a single genus may appear repeatedly; Pseudomonas, for example, is found eight times, indicating to the reader the meticulous care the author has used to make certain that each species of the genus as described in the Manual when studied in the laboratory may be satisfactorily placed in the appropriate genus. This diversity of pathways to placement of species in some genera points up with rather startling clarity the heterogeneity of such genera and the need for careful taxonomic revision. The type species of each genus is named, and the Bergey's Manual page reference to each genus given. Noteworthy also is the citation to Topley and Wilson (4th ed.) "wherever the correlation between the two terminologies could be clearly determined."

Under the heading "Digest of Genera" 220 genera are described in the sequence given in Bergey's Manual (94 pp.). The characters useful in distinguishing each genus from related genera are listed, in many cases with annotations which should prove helpful to those wishing to identify "unknown" strains. The number of species recognized in each genus is indicated and frequently in large genera there are suggested groupings proposed. This "Digest of Genera" is probably the most critical of any that has appeared in the recent literature of bacteriology.

The 31 plates (a few drawings, many microphotographs,

and a few electron microphotographs) illustrate one species from each of 162 genera of bacteria. The illustrations are well chosen, a large proportion original. The reproductions are adequate.

Skerman devotes 64 pages to an original and stimulating discussion of methods. His media and techniques as outlined bridge the gap between those particularly adapted to the cultivation of the saprophytic and parasitic bacteria and the less known methods for cultivation and study of autotrophs. Much of the material is the product of Skerman's laboratory. The presentation should stimulate research on many groups of bacteria poorly known and little studied.

The final section is a thought-provoking "Guide to Study". He places the genera of bacteria in thirty-two groups, on the basis of certain common characters. Actually he presents the outline of a revised classification which should be carefully studied.

An adequate index is included. The typography is excellent.

The Skerman Guide should prove to be a significant aid in the orientation of the student in the taxonomy of the bacteria.

Staphylococcus pyogenes and its relation to disease. By Stephen D. Elek. 767 pp. E. and S. Livingstone Ltd., Edinburgh and London. 1959.

The author notes that the task of monographing a single species of pathogenic microorganism such as "Staphylococcus pyogenes" from the standpoint of medical bacteriology is particularly difficult because of frequent lack of appreciation on the part of workers in this field of the value of contributions from related fields. He says:

> "The biology of a pathogenic micro-organism is common ground to chemists, geneticists, veterinarians, physicians, pathologists and workers in the field of public health, as well as to others."

The volume is a mine of information growing out of its

wide survey of pertinent literature. The fifteen chapters include in more or less detail abstracts of the contents of the 4300 references listed in the bibliography. The author notes the absence in his bibliography of a great number of references to papers "dealing with classical aspects of disease caused by staphylococci." The indices are adequate. The volume introduces the student to the many scientific and economic aspects of this species.

Elek emphasizes that "It is comparatively easy to be dogmatic (and right) about matters which have become clarified through more recent work. Many aspects of staphylococci are, however, still sub judice and it was felt better to refrain from judgement and to present the facts and claims as they appear. The expression of an opinion on such matters is merely to expose a personal bias, due to one's own inadequate experience in the field." The author in general follows the directive he has laid down, with a very few exceptions.

The reader is surprised and puzzled to find in a monograph devoted to a single species of microorganism an apparent lack of understanding of the real meaning and significance of the type concept recognized by international agreement by all biologists working in the field of taxonomy; by botanists, zoologists and bacteriologists. There is no reference in the subject index to "type species" or "type strain". That there should be no effort to relate the organism under study to the type concept dominant in all fields of biology, except perhaps in medical bacteriology is regrettable.

Dr. Elek's summary relative to taxonomy and nomenclature will serve to illustrate. He states that "there appear to be strong feelings about the correct name that should be applied to the coagulase-positive species," and further "it is generally conceded that the most appropriate term is Staphylococcus pyogenes (Breed, 1956)". The Breed article referred to is primarily a discussion of whether Rosenbach intended Staphylococcus pyogenes aureus (a ternary combination) to designate a species S. pyogenes var. aureus or whether it should be regarded as an illegitimate species name, later corrected by Rosenbach to S. aureus. However, Dr. Breed as editor of the 1948 and 1957 editions of the Bergey's Manual of Determinative Bacteriology did not recognize Staphylococcus pyogenes as the

correct name of this species. In the 1957 edition the name recognized as correct is Staphylococcus aureus. Dr. Elek notes that Cowan maintains that under the rules of bacterial nomenclature the correct binomial is S. aureus. The author ignores the fact that these rules have been adapted from the older Botanical and Zoological Codes of Nomenclature, formulated by an International Committee on Bacteriological Nomenclature representing more than thirty countries and approved by unanimous vote by the plenary sessions of two International Microbiological Congresses. Cowan urged that the rules laid down in the international agreement be followed. Dr. Elek counters by a seemingly irrelevant statement: "It seems that the question is like that of the correctness of the oft-disputed frontiers of certain European countries; it largely depends on how far one is prepared to go back in history." Here is evident a wholly unnecessary confusion between the definitions of the taxon (the fixing of the circumscription of the species) and the name to be applied to it. The author apparently agrees "that the name should be applied to the coagulase-positive species." In a sense he has circumscribed the species whose name he seeks.

He suggests that going back in history to Rosenbach (1884) is appropriate, but proposes that an "even earlier view" be taken and that "Staphylococcus pyogenes Ogston be regarded as justifiable," an apparently reasonable appeal to priority. Ogston's contributions (1880, 1881, 1882, 1883) antedate that of Rosenbach (1884). The Bacteriological Code recognizes priorities in bacteriology as beginning with 1753, the starting point of modern binomial nomenclature. When one searches for Ogston's proposal of Staphyloçoccus pyogenes, he is surprised to find that in none of the Ogston papers cited did this author propose Staphylococcus as the scientific name of a genus, and nowhere did he propose or use the binary combination Staphylococcus pyogenes. Ogston should not be held responsible for a name he did not propose. One wonders at the meaning of Dr. Elek's statement that Staphylcoccus pyogenes "dispenses with the unimportant adjective and refers to the organism by the name its discoverer gave to it." Elek apparently misses the point. If Ogston had named the species described by him there probably would have been no question raised as to its correctness. Unfortunately many important bacteria have been given vernacular names only by the discoverer.

There are numerous examples of such lapses in medical bacteriology. The organism significant in actinobacillosis was described but not named by Lignières et al., the tubercle bacillus was not named by Koch.

The inadequate treatment of taxonomy by Elek is in marked contrast to his treatment of other segments of his monograph. The chapter on Problems of Taxonomy is followed by thirteen others in which there is every evidence of wide acquaintance with the literature and ability to bring together pertinent material. Two chapters are devoted to morphology and staining reactions. Antigenic structure and serological classification, bacteriophages and lytic phenomena, distribution of S. pyogenes in nature, the specific serum-coagulase, the relation of diffusible products to tissues, virulence and disease, immune phenomena, effects of physical environment, antiseptics, chemotherapeutic agents, antibiotics and clinical problems are all extensively discussed. The literature is abstracted with care and accuracy, the gaps in knowledge pointed out clearly. One is sometimes disappointed in the author's refusal in many cases to synthesize answers from the evidence presented.

The treatise is encyclopedic in scope. Illustrations (usually photographs) are adequate. This book is a "must" for reference in the bacteriological laboratory.

INTERNATIONAL BULLETIN OF BACTERIOLOGICAL NOMENCLATURE AND TAXONOMY
Volume 10 No. 2 April 15, 1960 Page 85

EMENDATION OF PARAGRAPH 6 OF OPINION 11

Nomenclature of Species in the Bacterial Genus Shigella
Inclusion of the name of the species Shigella dysenteriae

A recommendation was made by W. H. Ewing that the name of the species Shigella dysenteriae be added to the list of species of the genus Shigella given in Paragraph 6 of Opinion 11.

The recommendation was submitted to the members of the Judicial Commission for a mail ballot, and was approved by an affirmative vote by ten members, one qualified negative vote and three abstentions.

Opinion 11, Paragraph 6 (Emended).

A culture belonging to the species Shigella dysenteriae, Shigella flexneri, Shigella boydii or Shigella sonnei may be completely identified by appending the appropriate serotype number (arabic) to the name.

REFERENCES

Boyd, J.S.K. and S.T. Cowan. 1951. Shigella species nomenclature and citation of authority. Internatl. Bull. Bact. Nomen. and Taxon. 1:147-149.

Editorial Board. 1953. Summary of Opinions and Preliminary Statements. File 54. Internatl. Bull. Bact. Nomen. and Taxon. 3:82-84.

Minutes Meeting of Judicial Commission. 1953. File 54. Shigella species nomenclature and citation of authority. Internat. Bull. Bact. Nomen. and Taxon. 3:150-151.

Judicial Commission. 1954. Nomenclature of species in the Bacterial Genus Shigella. Internat. Bull. Bact. Nomen. and Taxon. 4:148-149.

Ewing, W.H. 1958. Request for Emendation of Section 6 Opinion 11. Preliminary Statement. Internat. Bull. Bact. Nomen. and Taxon. 8:195-196.